Rikaline GPS-6017

GPS Receiver

SiRF Star III

User's   Guide

Dec. 13, 2005

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0. Quick Use

0.1 Check GPS Package
0.1.1 Standard Package
GPS-6017 (GPS Receiver) + Documents CD + Warranty Card + quick installation reference.
0.1.2 Optional Package
The shop may bundle different accessories for you as follows:
1. PC Cable
2. PDA Cable
3. PDA Holder
4. Software (Navigation Software + Digital Map)
5. Others

0.2 Check connector
1. A-6011 RS-232 Serial Port Connector
2. A-6031 USB Connector, Please install USB driver first.
   Note: The USB driver is a new one and different from Rikaline GPS-6010 series cable GPS.
3. When you connect your PDA to GPS-6017, you need an optional cable. Check the **e mark** (**FCC)** for safety and ensure the cigarette adapter with correct model number to avoid damaging your PDA.
4. Various cables are ready for your devices.

0.3 Basic Specification
1. Size: 62.0(W) x 46.1(D) x 18.0(H) (mm)
   2.44"(W) x 1.81"(D) x 0.71"(H).
2. Weight: 80g
3. Operating temperature: -40°C to +85°C(internal temperature).
4. Input voltage: +3.0 ~ 6.0 VDC without accessories.
5. Backup power: 3V Rechargeable Lithium cell battery, up to 230 hours (9.6 days) discharge.

0.4 Manufacturing Default
1. Sentence: GGA, GSA(5), GSV(5), RMC, VTG
2. Baud Rate: 9600
3. Datum: WGS84
4. WAAS: **OFF**. (**ON** is optional for the area of NA and Western Europe)

0.5 Important features
1. Fast acquisition: 20 parallel satellites acquisition
2. Advanced GPS chip: SiRF Star III Single chip
3. Fast TTFF: 200,000 effective correlators for fast TTFF at low signal levels
4. Built-in WAAS/EGNOS (Optional for WAAS/EGNOS covered area) for accurate positioning result.
5. Quick Host start: Built-in rechargeable Lithium battery for backup ephemeris for quick hot start.
6. Support NMEA 0183V2.2 data protocol.
7. Enhanced algorithms provide superior navigation performance in urban, canyon and foliage environments
8. User initialization is not required.
9. A rechargeable battery sustains internal clock and memory.
10. LED display status: The LED provides users visible positioning status. LED "BLINKING" when power connected and stays "ON" when GPS-6017 position identified. No more extra device needed.
11. Built-in Magnets for using on top of the car.
12. Water proof (1 meter) design for all weather.

0.6 Different Models
1. GPS-6017: with PS-2 connector, with RS-232 and TTL dual levels.
2. GPS-6017-U: with A type USB connector.
   USB Driver is new and different from other Rikaline cable GPS GPS-6010 / 6010-X5 series.
3. GPS-510 series: Bundled with Destinator software and Navteq map data.
   Details is at www.rikaline.com.tw

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1. Introduction

1.1 Overview

The *Rikaline* **GPS-6017 Smart Antenna** is a total solution GPS receiver, designed based on **SiRF Star III** SOC single chip architecture. This positioning application meets strict needs such as car navigation, mapping, surveying, security, agriculture and so on. Only clear view of sky and certain power supply are necessary to the unit. It communicates with other electronic utilities via compatible dual-channel through RS-232 or TTL and saves critical satellite data by built–in backup memory. With low power consumption, the **GPS-6017** tracks up to 12 satellites at a time, re-acquires satellite signals in 100 ms and updates position data every second. Trickle-Power (optional function) allows the unit operates a fraction of the time and Push-to-Fix (optional function) permits user to have a quick position fix even though the receiver usually stays off.

1.2 Features

The GPS-6017 provides a host of features that make it easy for integration and use.

1) Fast acquisition: 20 parallel satellites acquisition
2) Advanced GPS chip: SiRF Star III SOC
3) Fast TTFF: 200,000 effective correlators for fast TTFF at low signal levels
4) Built-in WAAS/EGNOS (Optional model for WAAS/EGNOS covered area) and DGPS for accurate positioning result.
5) Quick Host start: Built-in rechargeable Lithium battery for backup ephemeris for quick hot start.
6) Support MNEA 0183V2.2 data protocol.
7) Enhanced algorithms provide superior navigation performance in urban, canyon and foliage Environments.
8) User initialization is not required.
9) LED display status: The LED provides users visible positioning status. LED "BLINKING" when power connected and stays "ON" when GPS-6017 position identified. No more extra device needed.
10) Built-in Magnets for using on top of the car.
11) Water proof (1 meter) design for all weather.

1.3 Technology specifications

1.3.1 Physical Dimension
Single construction integrated antenna/receiver.
Size: 62.0(W) x 46.1(D) x 18.0(H) (mm)
     2.44"(W) x 1.81"(D) x 0.71"(H).
Weight: 95g

1.3.2 Environmental Characteristics
6. Operating temperature: -40°C to +85°C(internal temperature).
7. Storage temperature: -55°C to +100°C.

1.3.3 Electrical Characteristics
1) Input voltage: +3.0 ~ 6.0 VDC
                +6 ~ 30VDC with accessory A-6014.
2) Backup power: 3V Rechargeable Lithium cell battery, up to 230 hours (9.5 days) discharge.

1.3.4 Performance
1) Acquisition: 20 channel parallel
2) Tracking: up to 12 satellites.
3) Update rate: 1 second.
4) Acquisition time
   Reacquisition   0.1 sec., averaged
   Snap Start   3 sec, averaged

```
      Hot start          6 sec, averaged
      Warm start      38 sec., averaged
      Cold start       42 sec., averaged
```

4) Position accuracy:
    A) Non DGPS (Differential GPS)

```
            Position           <10 M at 2D RMS
            Velocity           0.1    meters/second, with SA off
            Time               1      microsecond synchronized GPS time
```

  B) DGPS (Differential GPS) or WAAS / EGNOS **ON** (Built by demand)

```
            Position           1 ~ 5 meter, typical
            Velocity           0.05   meters/second, typical
```

5) Dynamic Conditions:

```
      Altitude        18,000 meters (60,000 feet) max
      Velocity        515     meters / second (1000 knots) max
      Acceleration    4 G,    max
      Jerk            20      meters/second, max
```

1.3.5 Interfaces

1) Dual channel RS-232 or TTL compatible level, with user selectable baud rate (4800, **9600-Default**, 19200, 38400).
2) NMEA 0183 Version 2.2 ASCII output (GPGGA, GPGLL, GPGSA, GPGSV, GPRMC, GPVTG).
3) Real-time Differential Correction input (RTCM SC-104 message types 1, 5 and 9).
4) SiRF protocol.

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2. Operational characteristics

2.1 Initialization

As soon as the initial self-test is complete, the GPS-6017 begins the process of satellite acquisition and tracking automatically. Under normal circumstances, it takes approximately 45 seconds to achieve a position fix, 38 seconds if ephemeris data is known. After a position fix has been calculated, information about valid position, velocity and time is transmitted over the output channel.

The GPS-6017 utilizes initial data, such as last stored position, date, time and satellite orbital data, to achieve maximum acquisition performance. If significant inaccuracy exists in the initial data, or the orbital data is obsolete, it may take more time to achieve a navigation solution. The GPS-6017 Auto-locate feature is capable of automatically determining a navigation solution without intervention from the host system. However, acquisition performance can be improved when the host system initializes the GPS-6017 in the following situation:

1)   Moving further than 1,500 kilometers.
2)   Failure of data storage due to the inactive internal memory battery.

2.2 Navigation

After the acquisition process is complete, the GPS-6017 sends valid navigation information over output channels. These data include:

1)   Latitude/longitude/altitude
2)   Velocity
3)   Date/time
4)   Error estimates
5)   Satellite and receiver status

The GPS-6017 sets the default of auto-searching for real-time differential corrections in RTCM SC-104 standard format, with the message types 1, 5, or 9. It accomplishes the satellite data to generate a differential (DGPS) solution. The host system, at its option, may also command the GPS-6017 to output a position whenever a differential solution is available.

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3. Hardware interface

3.1 Dimension

Size: 62.0(W) x 46.1(D) x 18.0(H) (mm)
2.44"(W) x 1.81"(D) x 0.71"(H).

3.2 Hardware

The GPS-6017 includes an antenna in a unique style waterproof gadget. Simply connect PS-2 female connector to one of the optional accessories and link to either your notebook PC, PDA or other devices. The one-piece cigarette adapter allows you to connect GPS-6017 to your PDAs. Optional color, input voltage and output connector are listed and described below:
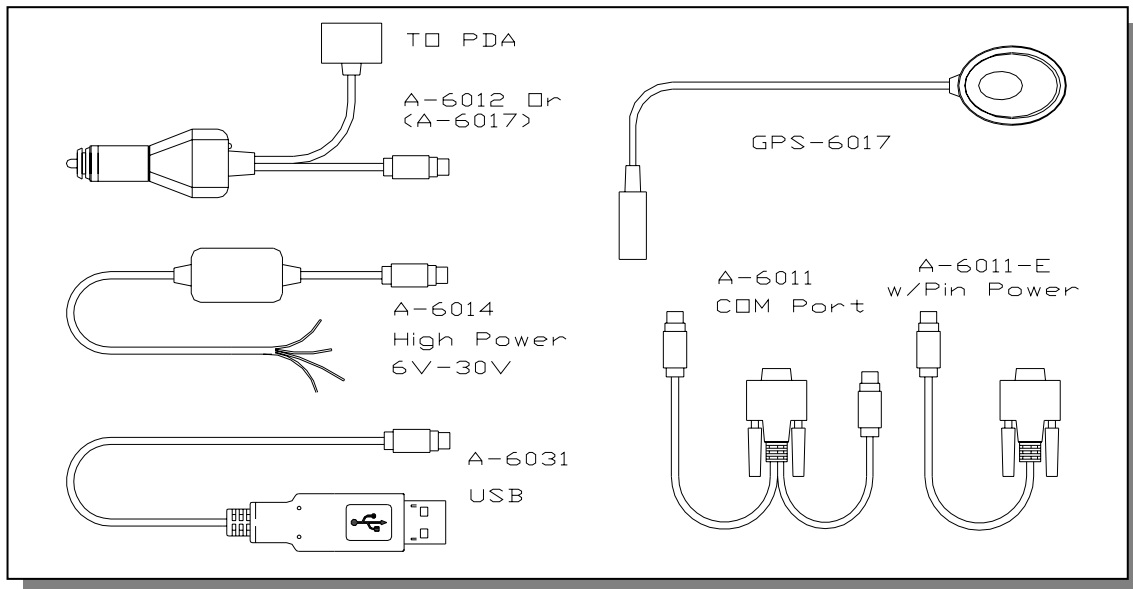
3.3 Connector

Standard cable: 2 meters with female PS-2 connector.
The GPS-6017 is also equipped with optional customized connectors.

3.3.1 Function definition of standard female PS-2 composite connector
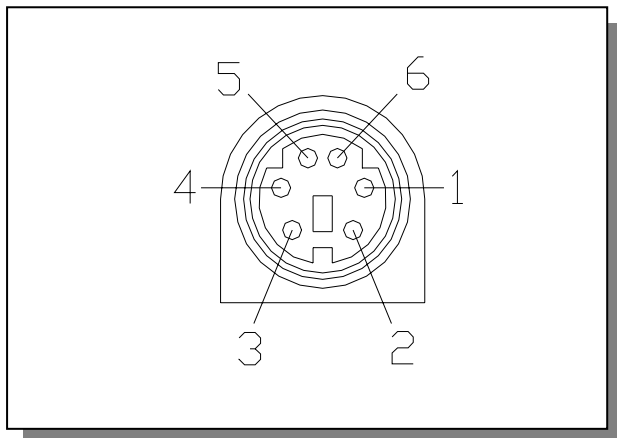
Pin	Signal (Standard)	Signal (DGPS)	Signal (1PPC)
1	Tx (RS-232)	Tx (RS-232)	Tx (RS-232)
2	+(3~6) VDC	+(3~6) VDC	+(3~6) VDC
3	Tx (TTL)	NC	NC
4	Ground	Ground	Ground
5	Rx (TTL)	DGPS IN	1 PPS
6	Rx (RS-232)	Rx (RS-232)	Rx (RS-232)

3.4 Accessories

For various applications, we provide different connectors.

3.4.1 A-6011 Mini Din Female and PS-2 male connector:
Cable Length: To GPS-6017: 1 meter
RS-232 to PS-2: 45 cm
Note: PS-2 with long cable (1 meter) is for GPS
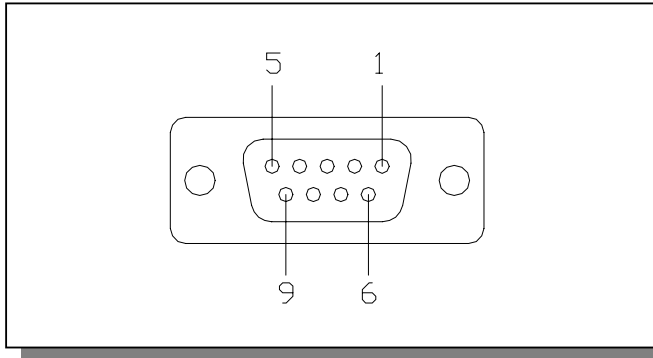PS-2 with short cable (45mm) is for power

3.4.1.1 Mini Din Female connector function definition:

Pin	Signal Name
1	N.C
2	Tx
3	Rx
4	N.C
5	Ground
6	N.C
7	N.C
8	N.C
9	DGPS in

N.C = No connection

3.4.1.2 PS-2 male connector function definition (to PC):
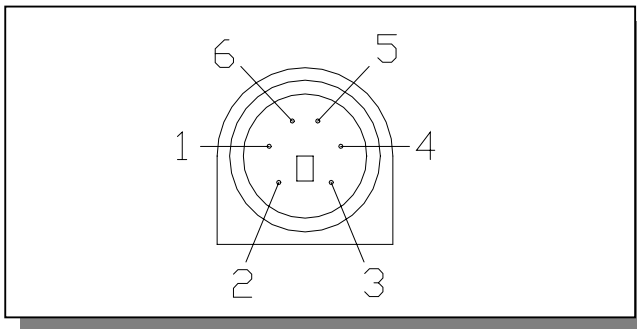
Pin	Signal Name
1	+3 ~ +6V
2	N.C
3	N.C
4	Ground
5	N.C
6	N.C

N.C = No connection

Remarks: **A-6011-S** is for COM+PS-2 converting to PS-2 female. If you have an old GPS receiver with standard COM + PS-2 male connector, you may choose an A-6011-S. Then you can use your old GPS receiver with PDA or USB version PC. PDAs with TTL output are not excluded.

3.4.2 A-6011-E   Mini Din Female w/Pin-9 power:
Cable Length: 0.5 meter

3.4.2.1 Mini Din Female connector function definition:
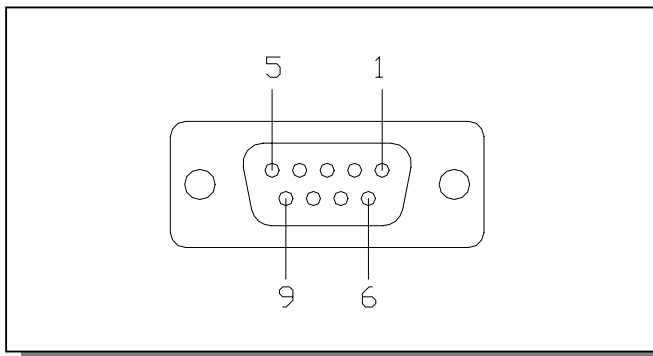
Pin	Signal Name
1	N.C
2	Tx
3	Rx
4	N.C
5	Ground
6	N.C
7	N.C
8	N.C
9	+(3~6)VDC

N.C = No connection

3.4.3   A-6031   USB Cable

The function definition of the A Type USB connector is as follows:
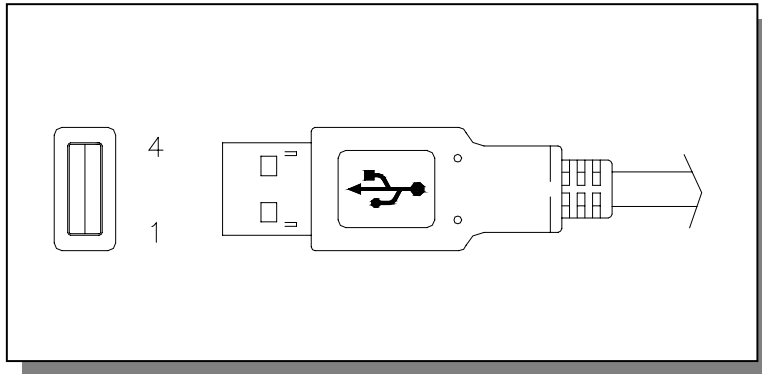
Pin	Signal Name
1	+5V
2	D +
3	D -
4	Ground

3.4.4   A-6014   High power connector

VCC (Red)
Tx (Green)
Rx (White)
DGPS (Orange)
(Build on Demand)
Ground (Black)
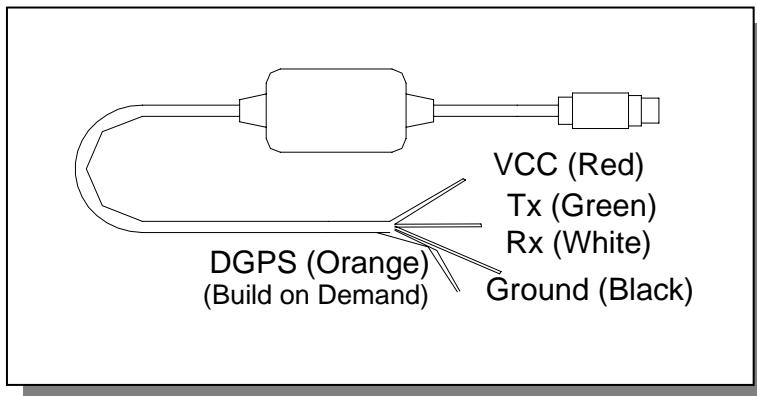
Color	Signal
Black	**Ground**
Red	**+6~30 VDC**
Green	**Tx(RS-232)**
White	**Rx(RS-232)**
Orange	**DGPS IN**

3.4.5   A-6016   Optional Cigarette Adapter

The optional cigarette adapter with 2-meter core cable is for using in a car or boat. It must be used together with an A-6011 or an old standard COM + PS-2 GPS receiver. Input voltage: DC12V – 26V

3.4.6   A-6017   Cigarette adapter and PDA connector:

Part No.	Application	Part No.	Application
A-6017-A	ASUA	A-6017-LS	Lenovo
A-6017-AR	ACER S series	A-6017-M	Mitac Mio
A-6017-B	BESTA I-WINNA	A-6017-N	NEC
A-6017-C	Casio	A-6017-P	Palm
A-6017-D	Dell Axim	A-6017-Q	I-Paq
A-6017-E	Eten	A-6017-S	Sony Series
A-6012-G	GSL Xplore	A-6017-SM	Siemens SX-45
A-6017-H	HP Jornada	A-6017-T	Toshiba Series
A-6017-L	Siemens LOOX	A-6017-X	O2-XDA / T-Mobile – MDA

4. USB Driver

4.1 System Requirements

IBM, Pentium or above and other compatible PC; 16 MB and above memory; Windows 98/Me/2000; VGA Graphic Adapter.

4.2 Installation

4.2.1 Virtual COM Port Driver Installation Windows XP

Follow these steps to install the Windows XP VCOM driver:
1. Connect the USB cable between the host computer and the cable target device.
2. Windows will open a "Found New Hardware Wizard" window.
3. Select "Install from a list or specific location (Advanced)" and press Next.
4. Select "Include this location in the search".
5. Press Browse to locate the "C:\Rikaline\WIN" directory. Once this directory is selected press OK.
6. Verify that the correct path and filename are shown and press Next.
7. Press Finish to finish installing the "CP210x USB Composite Device".
8. Windows will open a second "Found New Hardware Wizard" window.
9. Select "Install from a list or specific location (Advanced)" and press Next.
10. Select "Include this location in the search".
11. Press Browse to locate the "C:\Rikaline\USB_Cable\WIN" directory. Once this directory is selected press OK.
12. Verify that the correct path and filename are shown and press Next.
13. Press Finish to finish installing the "CP210x USB to UART Bridge Controller".

4.2.2 Virtual COM Port Driver Installation Windows 98 SE

Follow these steps to install the Windows 98 VCOM driver:
1. Connect the USB cable between the host computer and the cable target device.
2. Windows will open a "Found New Hardware Wizard" window. Press Next to continue.
3. Select "Search for the best driver for your device (Recommended)" and press Next.
4. Select "Specify a location".
5. Press Browse to locate the "C:\Rikaline\USB_Cable\WIN" directory. Once this directory is selected press Next.
6. Verify that the correct path and filename are shown and press Next.
7. Press Finish to finish installing the "CP210x USB Composite Device".
8. Windows will open a second "Found New Hardware Wizard" window. Press Next to continue.
9. Select "Search for the best driver for your device (Recommended)" and press Next.
10. Select "Specify a location".
11. Press Browse to locate the "C:\Rikaline\USB_Cable\WIN" directory. Once this directory is selected press Next.
12. Verify that the correct path and filename are shown and press Next.
13. Press Finish to finish installing the "CP210x USB to UART Bridge Controller".

4.2.3 Virtual COM Port Driver Installation Macintosh

To install the Macintosh OS-X virtual COM port driver, extract the cardinal-osx-V1_00c-release.zip file located in the MACX directory created in "C:\Rikaline\USB_Cable" Next, run the extracted file SLAB_USBtoUART Installer. To uninstall the driver, run the extracted file SLAB_USBtoUART Uninstaller.
Macintosh OS-9 virtual COM port drivers are currently available by request only.

4.2.4 Virtual COM Port Driver Installation Linux 2.40

The Linux virtual COM port driver included with the CP2102EK evaluation kit support Linux versions 2.40 and later.
To install the driver, extract the cardinal-redhat9-V0_81a.tar file located in the LINUX directory created in "C:\Rikaline\USB_Cable" Next, run the extracted file load_mcci_usb. To uninstall the driver, run the extracted file
unload_mcci_usb.

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5. Warranty

The GPS-6017 is warranted to be free from defects in material and functions for one year from the date of purchase. Any failure of this product within this period under normal conditions will be replaced at no charge to the customers.

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Appendix A Software Interface

The GPS-6017 interface protocol is based on the National Marine Electronics Association's NMEA 0183 ASC II interface specification, which is defined in NMEA 0183, Version 2.2 and the Radio Technical Commission for Maritime Services (RTCM Recommended Standards For Differential Navstar GPS Service, Version 2.1, RTCM Special Committee No.104).

A.1 NMEA Transmitted Messages

The GPS-6017 supported by SiRF Technology Inc. also outputs data in NMEA-0183 format as defined by the National Marine Electronics Association (NMEA), Standard.

The default communication parameters for NMEA output are 9600 baud, 8 data bits, stop bit, and no parity.

Table A-1 NMEA-0183 Output Messages

NMEA Sentence	Description
GPGGA	Global positioning system fixed data
GPGLL	Geographic position latitude \ longitude
GPGSA	GNSS DOP and active satellites
GPGSV	GNSS satellites in view.
GPRMC	Recommended minimum specific GNSS data
GPVTG	Course over ground and ground speed

A.1.1 Global Positioning System Fix Data (GGA)

Table A-2 contains the values for the following example:

$GPGGA,161229.487,3723.2475,N,12158.3416,W,1,07,1.0,9.0,M, , , ,0000*18

Table A-2 GGA Data Format

Name	Example	Units	Description
Message ID	$GPGGA		GGA protocol header
UTC Time	161229.487		Hhmmss.sss
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E=east or W=west
Position Fix Indicator	1		See Table 5-3
Satellites Used	07		Range 0 to 12
HDOP	1.0		Horizontal Dilution of Precision
MSL Altitude	9.0	Meters	
Units	M	Meters	
Geoid Separation		Meters	
Units	M	Meters	
Age of Diff. Corr.		second	Null fields when DGPS is not used
Diff. Ref. Station ID	0000		
Checksum	*18		
<CR> <LF>			End of message termination

Table A-3 Position Fix Indicator

Value	Description
0	0 Fix not available or invalid
1	GPS SPS Mode, fix valid
2	Differential GPS, SPS Mode, fix valid
3	GPS PPS Mode, fix valid

A.1.2 Geographic Position with Latitude/Longitude (GLL)

Table A-4 contains the values for the following example:

$GPGLL,3723.2475,N,12158.3416,W,161229.487,A*2C

Table A-4 GLL Data Format

Name	Example	Units	Description
Message ID	$GPGLL		GLL protocol header
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E=east or W=west
UTC Position	161229.487		hhmmss.sss
Status	A		A=data valid or V=data not valid
Checksum	*2C		
<CR> <LF>			End of message termination

A.1.3 GNSS DOP and Active Satellites (GSA)

Table A-5 contains the values for the following example:

$GPGSA,A,3,07,02,26,27,09,04,15, , , , , ,1.8,1.0,1.5*33

Table A-5 GSA Data Format

Name	Example	Units	Description
Message ID	$GPGSA		GSA protocol header
Mode 1	A		See Table 5-6
Mode 2	3		See Table 5-7
Satellite Used (1)	07		Sv on Channel 1
Satellite Used (1)	02		Sv on Channel 2
……			….
Satellite Used			Sv on Channel 12
PDOP	1.8		Position Dilution of Precision
HDOP	1.0		Horizontal Dilution of Precision
VDOP	1.5		Vertical Dilution of Precision
Checksum	*33		
<CR> <LF>			End of message termination

(1) Satellite used in solution.

Table A-6 Mode 1

Value	Description
M	Manual—forced to operate in 2D or 3D mode
A	2D Automatic—allowed to automatically switch 2D/3D

Table A-7 Mode 2

Value	Description
1	Fix Not Available
2	2D
3	3D

A.1.4 GNSS Satellites in View (GSV)

Table A-8 contains the values for the following example:

$GPGSV,2,1,07,07,79,048,42,02,51,062,43,26,36,256,42,27,27,138,42*71
$GPGSV,2,2,07,09,23,313,42,04,19,159,41,15,12,041,42*41

Table A-8 GSV Data Format

Name	Example	Units	Description
Message ID	$GPGSV		GSV protocol header
Number of Messages	2		Range 1 to 3
Message Number	1		Range 1 to 3
Satellites in View	07		Range 1 to 12
Satellite ID	07		Channel 1 (Range 1 to 32)
Elevation	79	degrees	Channel 1 (Maximum 90)
Azimuth	048	degrees	Channel 1 (True, Range 0 to 359)
SNR (C/No)	42	dBHz	Range 0 to 99, null when not tracking
....	....		
Satellite ID	27		Channel 4 (Range 1 to 32)
Elevation	27	degrees	Channel 4 (Maximum 90)
Azimuth	138	degrees	Channel 4 (True, Range 0 to 359)
SNR (C/No)	42	dBHz	Range 0 to 99, null when not tracking
Checksum	*71		
<CR> <LF>			End of message termination

NOTE: Items <4>,<5>,<6> and <7> repeat for each satellite in view to a maximum of four (4) satellites per sentence. Additional satellites in view information must be sent in subsequent sentences. These fields will be null if unused.

A.1.5 Recommended Minimum Specific GNSS Data (RMC)

Table A-9 contains the values for the following example:

$GPRMC,161229.487,A,3723.2475,N,12158.3416,W,0.13,309.62,120598, ,*10

Table A-9 RMC Data Format

Name	Example	Units	Description
Message ID	$GPRMC		RMC protocol header
UTC Time	161229.487		hhmmss.sss
Status	A		A=data valid or V=data not valid
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E=east or W=west
Speed Over Ground	0.13	Knots	
Course Over Ground	309.62	Degrees	True
Date	120598		ddmmyy
Magnetic Variation (1)		Degrees	E=east or W=west
Checksum	*10		
<CR> <LF>			End of message termination

　(1) SiRF Technology Inc. does not support magnetic declination. All "course over ground" data are geodetic WGS84 directions.

A.1.6 Course Over Ground and Ground Speed

Table A-10 contains the values for the following example:

$GPVTG,309.62,T, ,M,0.13,N,0.2,K*6E

Table A-10 VTG Data Format

Name	Example	Units	Description
Message ID	$GPVTG		VTG protocol header
Course	309.62	Degrees	Measured heading
Reference	T		True
Course		Degrees	Measured heading

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Reference	M		Magnetic (1)
Speed	0.13	Knots	Measured horizontal speed
Units	N		Knots
Speed	0.2	Km/hr	Measured horizontal speed
Units	K		Kilometers per hour
Checksum	*6E		
<CR> <LF>			End of message termination

(1) SiRF Technology Inc. does not support magnetic declination. All "course over ground" data are geodetic WGS84 directions.

A.2 RTCM Received Data

The default communication parameters for DGPS Input are 9600 baud, 8 data bits, stop bit, and no parity. Position accuracy of less than 5 meters can be achieved with the GPS-6017 by using Differential GPS (DGPS) real-time pseudo-range correction data in RTCM SC-104 format, with message types 1, 5, or 9. As using DGPS receiver with different communication parameters, GPS-6017 may decode the data correctly to generate accurate messages and save them in battery-back SRAM for later computing.

Appendix B Earth Datums & Output Setting

B.1 Earth Datums
The GPS-6017 is built in earth datum with WGS84.

B.2 Setting
B.2.1 Manufacturing Default
Datum: WGS84.
Baud Rate: 9600.
Output: GGA, GSA, GSV, RMC, VTG.
WAAS/EGNOS: OFF (Optional ON is for the area covered by WAAS/EGNOS)

B.2.2 Baud Rate and Output Sentences Setting

B.2.2.1 By SiRFdemo Program
1// Connect your GPS-6017 to PC (either COM or USB)
2// Execute SiRFdemo.exe (Program is in the CD)
3// When "Data Source Setup" shows, select the port (COM 1, 2 or 3….) you used, click "OK".
4// Click "Action", select "Open Data Source", Then you will see lots of sentences shows. All the sentences start with $GPxxxx. This is NMEA protocol. If you do not see these sentences, please click "View", "Select Message", then click "Development". The message will appear. If it still shows nothing, then continue below steps.
5// There is a screen "Selection of Target Receiver Software" might appear, please select "SiRFstar II".
6// Click "Action", Select "Switch to SiRF Protocol". Then you will see SiRF binary and the sentences start with #Time, shows every 4 lines and you can not see the sentences start with $GP. These sentences are for setting or viewing the GPS receiver's performance. If your software is using standard NMEA protocol, please do the following:
7// Click "Action", Select "Switch to NMEA Protocol". You will see GGA, GSV, GSA and RMC in black and the Baud Rate is 4800. These are the default we put inside the receiver. Please click "OK". Then you can use it as a standard GPS receiver. If your software uses different sentence, please choose the sentences you need.

After above actions, the new setting will be kept in SRAM. If no power supplied to GPS-6017 for more than than 10 days, user must re-set again when power on.

B.2.2.2 By other SiRF based demo program
There are a few companies or private website providing some very good demo software.

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Appendix C   Ordering Information

C.1 Product Options
C.1.1 OutPut Level (or Data)

GPS-6017: RS-232 & TTL (Standard)   With 2-meter Cable and PS-2 Female Connector.

C.1.2 Color Option
BK   Black (Standard)
Other Color: by demand

C.2 Accessories
C.2.1 Cables
A-6011   Com Port connector (For use with standard RS-232 port)
A-6011-S   Standard COM+PS-2 converting to PS-2 connector (Enable standard old GPS receiver to use
           with PDA or PC)
A-6011-E   Mini Din connector with pin 9 POWER
A-6012   PDA connector with Cigarette Adapter (850mA)
A-6014   High power adapter, 6-30VDC
A-6015   Magnetic pad (for GPS-6017 only)
A-6016   Cigarette adapter, must be used with A-6011 or standard COM + PS-2 GPS.
A-6031   USB connector (Use with standard GPS-6017)
A-6017   PDA connector with Cigarette Adapter (2A)

Seq.	Part No.	Appl. Model
1	A-6017-A	ASUS A-600
2	A-6017-A1	ASUS A-620
3	A-6017-AR	ACER S60 / N20 series
4	A-6017-AR2	ACER N30
5	A-6017-B	BESTA I-WINNA
6	A-6017-C	Casio E-115
7	A-6017-C1	Casio E-125
8	A-6017-C2	Casio E-200
9	A-6017-D	Dell Axim X-5
10	A-6017-D1	Dell Axim X-3
11	A-6017-E	Eten P603
12	A-6012-G	GSL Xplore G18
13	A-6012-G1	GSL Xplore G88
14	A-6017-H	HP Jornada 52xx / 54xx / 56xx
15	A-6017-HS	HandSpring Treo
16	A-6017-HS1	HandSpring Visor\Prism
17	A-6017-HS2	HandSpring Edge
18	A-6017-L	Siemens LOOX
19	A-6017-LS	Lenovo SP-230
20	A-6017-M	Mitac Mio 528 / 338 / Yakumo Alpha+Delta
21	A-6017-N	NEC 300E
22	A-6017-P	Palm Vx
23	A-6017-P1	Palm / IBM WorkPad 500/505/
24	A-6012-P3	Palm Zire 71/72, Tungsten T\T2\T3
25	A-6017-Q	I-Paq 36xx / 37xx
26	A-6017-Q1	I-Paq 38xx / 39xx / 54xx
27	A-6017-S	Sony N-7xx / S-xx
28	A-6017-S1	Sony T-6xx / NR-xx / SL-xx / SJ-xx
29	A-6017-SM	Siemens SX-45
30	A-6017-T1	Toshiba E-570

Seq.	Part No.	Appl. Model
31	A-6017-T2	Toshiba E-330/740
32	A-6017-X	O 2 – XDA / T-Mobiles – MDA
33	A-6017-X1	MDA II

Remarks: All A-6017 series Cigarette Adapters are up to 2A and with certificate of
CE, FCC and **e mark** no. **021433**.
All A-6012 series Cigarette Adapters are up to 850mA with certificate of
CE, FCC and **e mark** too.

C.2.2 PDA Holders

1	A-2002-B	PDA Holder, Suction Cup, 150mm, Short Arm, Magnetic Pad
2	A-2002-BL	PDA Holder, Suction Cup, 320mm, Long Arm, Magnetic Pad
3	A-2011	Talk Holder, w/main unit, suction cup, cig. power & 4.0mmGPS power cable
4	A-2501-xx	PDA connector and earphone cable, xx means different PDA
5	A-2011	PDA holder

C.3 Products Combination
C.3.1 Standard package
GPS-6017 (GPS Receiver) + Documents CD + Warranty Card + quick installation reference.

C.3.2 Other Combination for GPS Application
C.3.2.1 Navigation
GPS-6017 + A-6011   Laptop PC Navigation (COM version)
GPS-6017 + A-6012   PDA Navigation (850mA power)
GPS-6017 + A-6031   Laptop PC Navigation (USB version)
GPS-6017 + A-6017   PDA Navigation (2A power)

C.3.2.2 Other Popular GPS Application
GPS-6017 + GPS system for Tracking, Security, Fleet Management

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